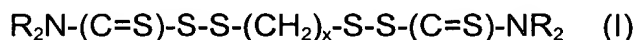


REMARKS

Table 2 has been amended to correct an obvious typographical error. In column 2 heading should read (Comparison 1). In column 1, line 2 should read (MU). In line 10 of Table 2, the temperature of the second rheometer reading is obviously incorrect since the temperature is listed as being identical to the first rheometer reading in line 4, 150°C. Accordingly, the Applicants have amended the second rheometer meeting to be 180°C.

In the Office Action dated The Examiner rejected Claims 1 - 11 under 35 U.S.C. 103(a) as obvious over Traivette (U.S. Patent No. 3,979,369) or Wolpers, et al. (Dn 120:10211)(U.S. Patent No. 5,342,900) or Nordsiek, et al. (Dn122:135730). Claim 1 of the present invention claims a vulcanizable rubber compound based on diene rubbers and customary additives, comprising a vulcanizing system contained in the compounds comprising a) 0.5 to 3.8 parts by weight of compound (I)



wherein R = (C₆H₅CH₂); and X =6; b) 0.5 to 2 parts by weight sulfur; and c) 0.5 to 3.0 parts by weight of at least one vulcanization accelerator wherein the parts by weight are given in each case with respect to 100 parts by weight of rubber. Claims 2 - 5 are dependent on Claim 1. Claim 6 claims a rubber molding with the elements of Claim 1. Claims 7 - 11 are dependent on Claim 6.

The Examiner indicates that Traivette, Wolper, et al. and Nordsiek, et al. disclose vulcanizing systems similar to the one in the claimed composition.

The Examiner indicates that Traivette discloses a large list of compounds, wherein the claimed vulcanizing system is suggested to include compound I and an appropriate range of sulfur.

Traivette contains a very general discussion of the use of compounds of the general formula A-S-S-R-S-S-A' for the vulcanization of rubbers, wherein R constitutes almost any divalent organic radical, and A and A' constitute a very large number of accelerator radicals, which also include N-substituted thiocarbamoyl radicals amongst others. However, the compound 1,6-bis(N,N-dibenzylthiocarbamolydithio)-hexane is not disclosed or suggested in Traivette. Traivette does not disclose or suggest the technological profile of vulcanized rubber

compounds containing 1,6-bis(N,N-dibenzylthiocarbamoyldithio)-hexane as the cross-linker.

Traivette discloses that the crosslinking agents of the formula A-S-S-R-S-S-A' can be used on their own or can also be used with sulfur and vulcanization accelerators (Col. 25, lines 15 to 19). The addition of elemental sulfur preferably falls within the range from 0.5 to 1.5 parts by weight sulfur with respect to 100 parts by weight rubber (Col. 25, lines 19 - 24). In addition, Traivette discloses the crosslinking agents of the invention, in combination with amounts of sulfur greater than 1.5 parts by weight, result in a decrease in the level of processing safety of these rubber compounds (Col. 25, lines 24 to 26).

For a person of ordinary skill in the art, one measure of the level of processing safety is the Mooney scorch time. A short Mooney scorch time signifies a low level of processing safety, whereas a long Mooney scorch time signifies a high level of processing safety. A high level of processing safety of rubber compounds is very desirable because the addition of vulcanization retarders can thereby be dispensed with.

In Traivette, is it shown that in using masterbatch A (an NR compound), the rubber compound according to Stock 7 of Table VII, which comprises 1.0 part by weight 1,2-bis(N,N-dimethylthiocarbamoyldithio)-ethane and 1.7 parts by weight sulfur, has a Mooney scorch time ($t_9/121^\circ\text{C}$) of only 25.7 minutes. In comparison, the compound according to Stock 1 of Table III (control example, masterbatch A), which comprises 2.0 parts by weight sulfur and 0.5 parts by weight Santocure NS (benzothiazyl-2-tert.-butylsulphenamide, TBBS) as an accelerator, has a Mooney scorch time ($t_9/121^\circ\text{C}$) of 32.0 minutes, i.e. the level of processing safety of the rubber compound in Stock 7 of Table VII, which comprises 1.7 parts by weight of sulfur has actually become inferior to that of the control example.

As evidenced by Stock 6 of Table VII, there is, in fact, a deterioration of the level of processing safety (Mooney scorch time) even at an addition of sulfur of more than 1.0 parts by weight (please compare $t_9/121^\circ\text{C}$ of 32.1 minutes), as measured on the control compound (see Stock 1, Table III, $t_9/121^\circ\text{C}$ of 32.0 min.)

Therefore, Traivette creates a technical prejudice with respect to the processing safety of rubber compounds containing crosslinkers of the general

A

formula A-S-S-R-S-S-A' in terms of the Mooney scorch time. Even though Traivette discloses a level of sulfur from 0.5 to 1.5 parts by weight, even at an addition of sulfur of more than 1.0 parts by weight, a deterioration of the processing safety (Mooney scorch time) takes place as shown by experiments. Thus, the Applicants respectfully submit that Traivette teaches away from the presently claimed invention.

Wolpers, et al. discloses a method of producing vulcanized diene rubber materials with a crosslinking agent system consisting of 1 to 4.5 parts by weight of 1,2-bis (N,N-dibenzylthiocarbamoyldithio)-ethane or of 1,6-bis(N,N-dibenzylthiocarbamoyl-dithio)-hexane, sulfur and selected amounts of vulcanization accelerators. The range of sulfur disclosed by Wolpers, et al., is between 0.05 to 0.3 parts by weight of sulfur, whereas the presently claimed invention claims a higher range of 0.5 to 2 parts by weight of sulfur. Accordingly, the Applicants respectfully submit that the presently claimed invention is neither disclosed nor suggested by Wolpers, et al.

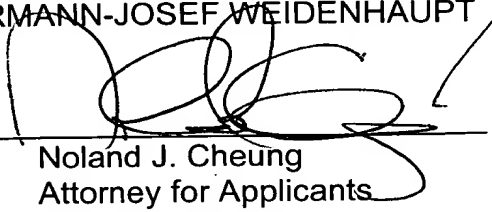
107 Nordsiek, et al. discloses stable crosslinks by thioalkane vulcanization. The formulations in Tables 1 and 2 of Nordsiek, et al. disclose or suggest the use of 1,6-bis(N,N-dibenzylthiocarbamoyl-dithio)-hexane in the absence of sulfur and additional accelerators. The recipes of Table 3, 4 and 5 disclose the use of 1,6-bis(N,N-dibenzylthiocarbamoyldithio)-hexane in the presence 0.2 parts by weight sulfur and 1.5 parts by weight of MBTS as an accelerator. Figure 13 discloses a vulcanizing system containing 3.3 parts by weight 1,6-bis(N,N-dibenzylthiocarbamoyldithio)-hexane, 0.4 parts by weight TBBs and 0.2 parts by weight of sulfur. In contrast, the presently claimed invention claims 0.5 to 2 parts by weight. Accordingly, the Applicants respectfully submit that the presently claimed invention is neither disclosed nor suggested by Traivette, Wolpers, et al. or Nordsiek, et al.

For any and all of the aforementioned reasons, reconsideration and early allowance of Claims 1 - 11 is courteously requested.

Respectfully submitted,

WINFRIED JESKE
HARTMUTH BUDING
HERMANN-JOSEF WEIDENHAUPT

By



Noland J. Cheung
Attorney for Applicants
Reg. No. 39,138

Bayer Corporation
100 Bayer Road
Pittsburgh, Pennsylvania 15205-9741
(412) 777-8338
FACSIMILE PHONE NUMBER:
(412) 777-8363

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

On page 11, please delete Table 2, and replace with the following new Table 2 showing changes made.

Table 2: Rheological data on test compounds

Compound number	Example 1 (Comparison 1)	Example 2	Example 3	Example 4 (Comparison 2)
ML (1+4) 100°C (ME) --(MU)--	64	69	67	73
Scorch time (120°) t ₅ (min)	15.3	23.3	28.0	29
Rheometer 150°C				
ts01 (min)	2.1	3.5	4.5	4.5
t95 (min)	10.1	9.0	12.9	13.4
Smin (dNm)	1.6	2.6	2.6	2.5
S'max (dNm)	17.9	19.5	18.6	19.8
Send, 30 min (dNm)	17.6	19.3	18.5	19.7
Rheometer 150°C --180°C--				
ts01 (min)	0.5	0.7	0.9	0.9
t95 (min)	1.7	1.7	2.4	2.5
Smin (dNm)	1.4	2.4	2.3	2.3
S'max (dNm)	17.7	18.1	17.1	18.4
Send 30 min (dNm)	11.1	17.0	16.7	18.2